

Baker Hughes Pipeline Management Group

Baker Hughes Pipeline Management Group Casing Identification and Reporting

Presented July 2008



V-Line Pipeline Inspection – Single Access



V-Line Pipeline Inspection – Duel Access

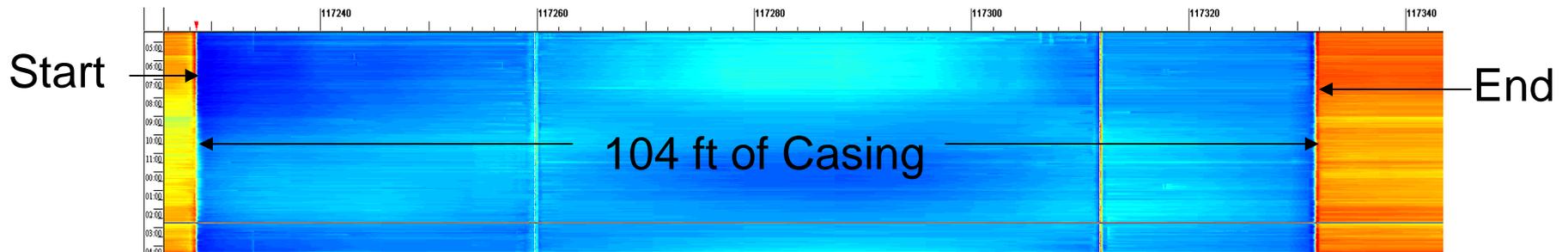


Casing Identification

- Detection of Casings
- Detection of Features in Casings
- Detection of Eccentric Casings
- Detection of Metal Loss
- Probability of Sizing Metal Loss
- Limitation of Detection and Sizing of Metal Loss

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Detection of Casing



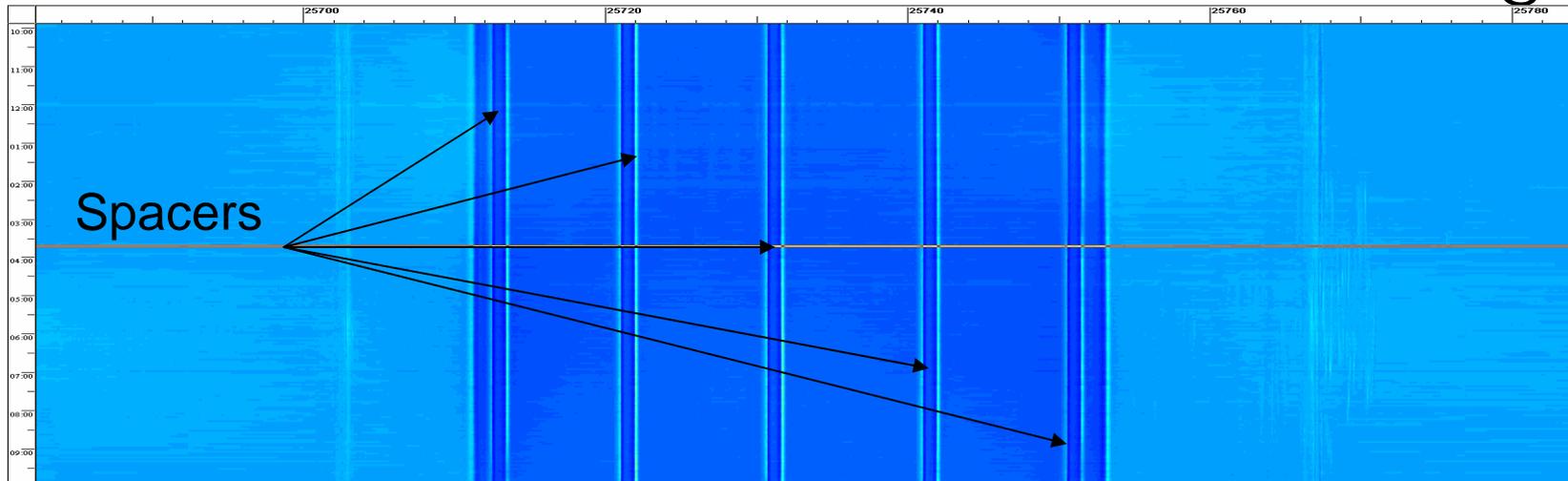
Casings are detected as a metal gain object around the full circumference of the pipe

The start and end of casing are evident in the data and estimated lengths of casings are provided

Probability of detection of a casing is 100%

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Detection of Features within a Casing

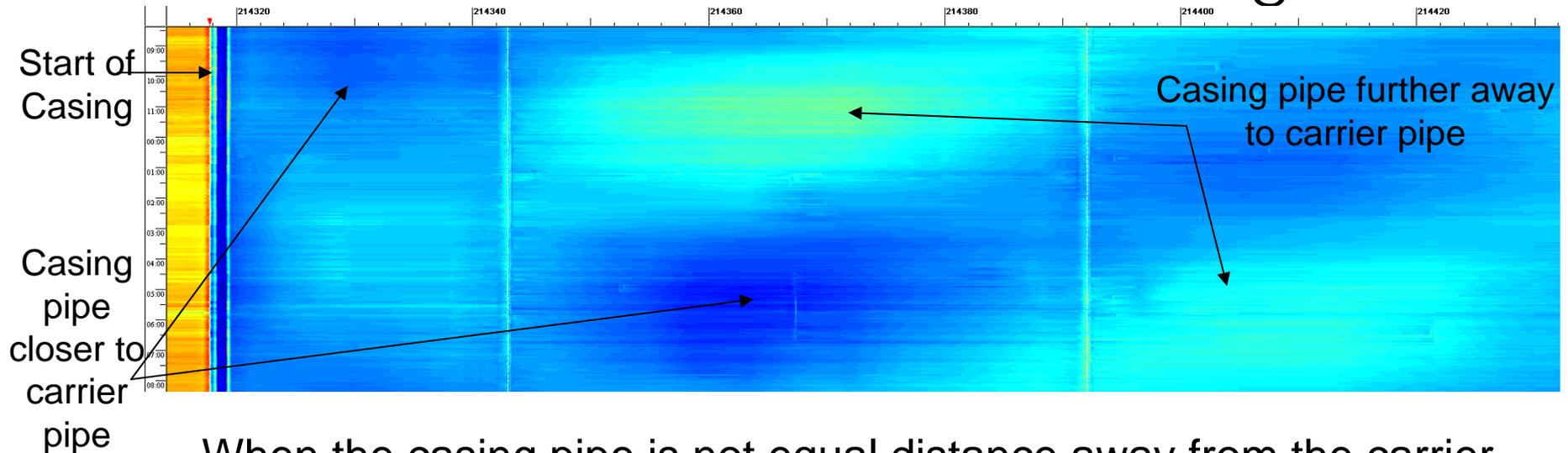


Spacers are found sandwiched between the carrier and casing pipe to isolate the casing pipe from the carrier pipe.

Most detectable spacers are found in older cased pipe pre-dating 1970, newer pipes either do not have cased crossings or the spacers are built entirely of nylon without carbon steel present.

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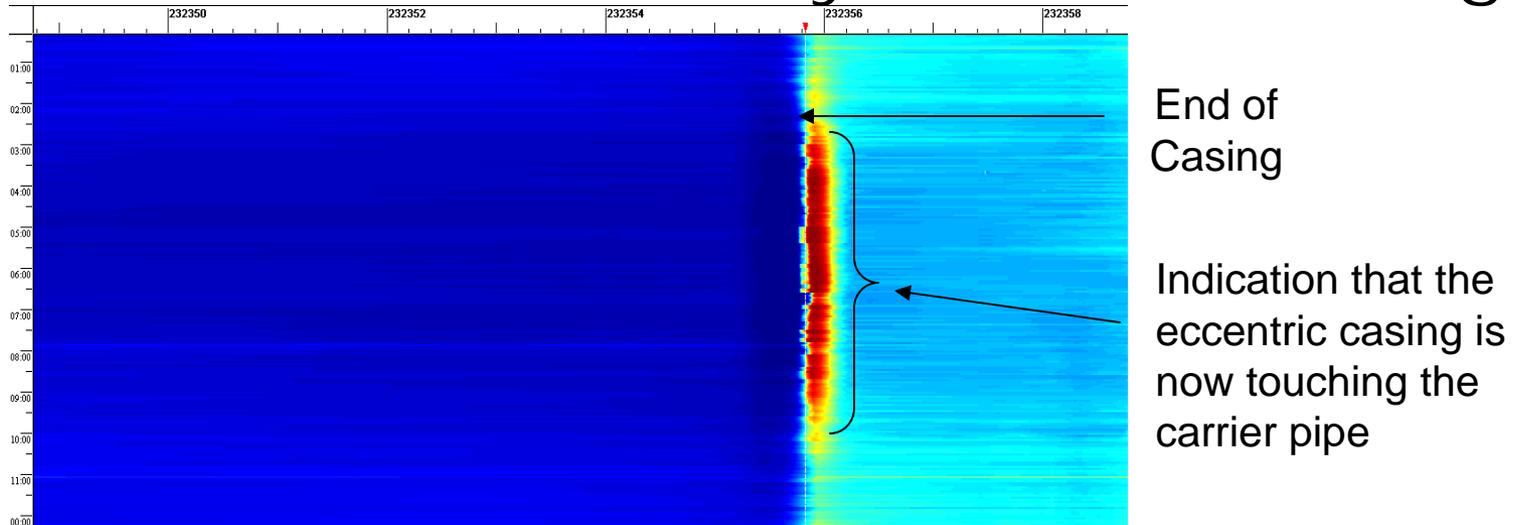
Detection of Eccentric Casings



When the casing pipe is not equal distance away from the carrier pipe it is thought to be eccentric. Detection of casing pipe's proximity to carrier pipe is well illustrated.

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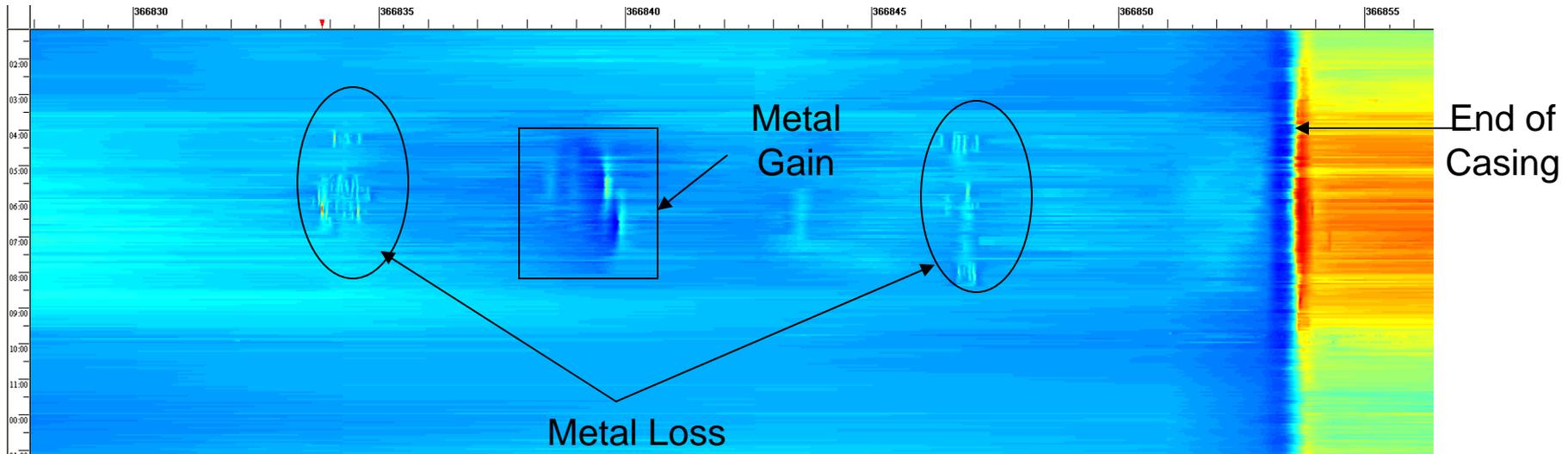
Detection of Mechanically Shorted Casings



When the casing pipe has come in contact with the carrier pipe a mechanical shorted condition exists. The cathodic protection is no longer effective in this cased crossing location. Probable location for future accelerated growth of metal loss.

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Detection of Metal Loss



Metal Loss (carrier pipe) under casing is detected very accurately by an MFL tool and sized within the specifications of the tool. Discriminating between internal and external metal loss on the carrier pipe is accomplished by different sensors on board the tool that are not adversely affected by the presence of the casing.

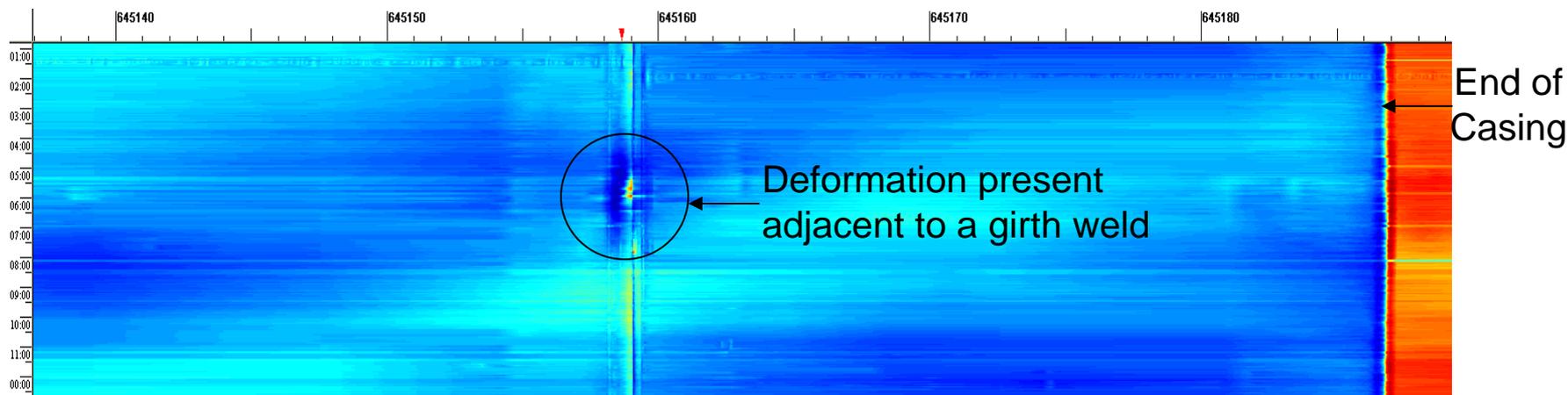
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Probability of Sizing Metal Loss within a Stated Tolerance

Isolated Metal Loss	(Defect area < 3t X 3t)
Minimum Depth for Sizing Accuracy	0.1t
Sizing Accuracy (depth)	± 0.1t (± 0.15t for seamless pipe) @ 80% confidence
Sizing Accuracy (length)	± 0.40" (10 mm) @ 80% confidence
Area-type Metal Loss	(Defect area > 3t X 3t)
Minimum Depth for Sizing Accuracy	0.1t
Sizing Accuracy (depth)	± 0.1t (± 0.15t for seamless pipe) @ 80% confidence
Sizing Accuracy (length)	± 0.80" (20 mm) @ 80% confidence

t = wall thickness

Detection of Deformation



Detection of deformations (dents) under casings is possible with MFL technology, but MFL alone cannot determine the % restriction of the deformation without the aid of caliper sensors.

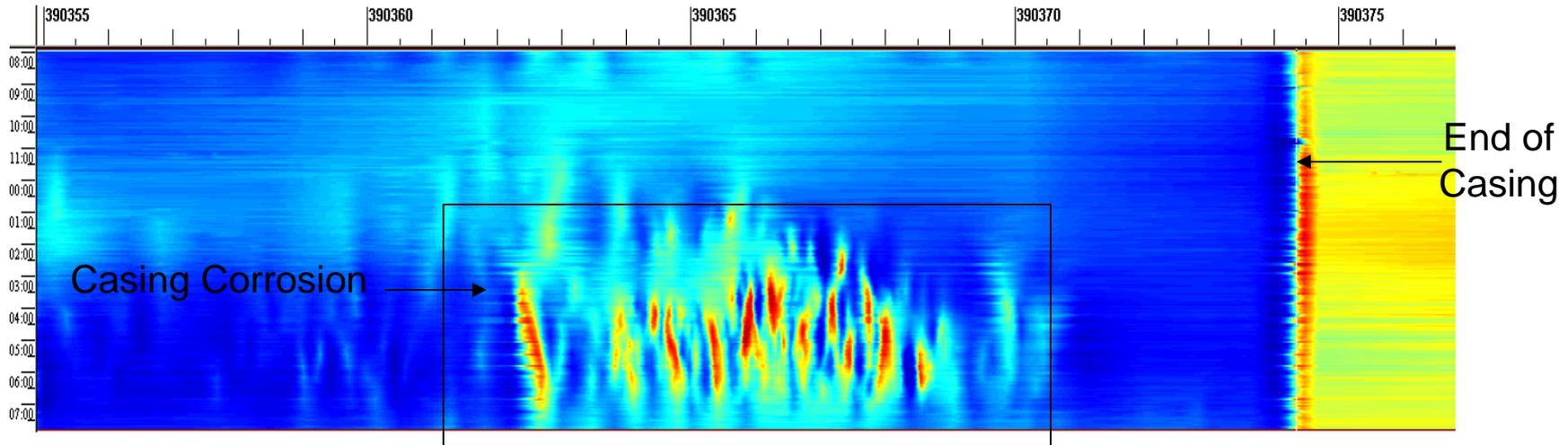
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Limitation of Detection and Sizing Metal Loss

- Metal loss will be detected, but sizing of the metal loss within a stated tolerance at point of contact of casing pipe and carrier pipe is not possible
- The above statement is also true when metal loss is present under detectable spacers
- In rare cases if casing pipe is severely corroded it can be mistakenly interpreted as carrier pipe corrosion

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Casing Pipe Corrosion



Detection of metal loss on the casing pipe is possible, but there has to be significant amount of metal loss depth and length. Sizing accuracy is not provided for such conditions.

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Thank You

